Corrosion Control Supplemental Information

The treatment options for corrosion control, as specified by the Lead and Copper Rule, consist of pH and alkalinity adjustment, calcium adjustment and silica or phosphate-based corrosion inhibition.

The EPA cannot recommend treatment technologies, companies, or products. However, to help you make the best decision possible, for your water system we are including the information below to assist you in your corrosion control recommendation.

The optimal corrosion control treatment is to be selected on the basis of four factors: performance, feasibility, reliability, and costs.

Any product recommended to your water system to meet the requirements of the Lead and Copper rule should carry the **NSF** International label.

If you need any assistance with your Optimal Corrosion Control Treatment (OCCT) recommendation, please contact;

Linda Himmelbauer 303-312-6263

Or

VelRey Alaniz 303-312-6001

Other potential resources:

The American Water Works Association **www.awwa.org**
Water Online **www.wateronline.com**
Small System Clearinghouse **www.nde.wvu.edu**

pH/Alkalinity and Calcium Adjustment

The table below provides a summary of chemicals typically used for pH/Alkalinity and Calcium Adjustment.

Chemical	Use	Composition	Alkalinity Change	Notes
Caustic Soda (NaOH)	Raise pH. Convert excess CO_2 to alkalinity species	93% purity liquid bulk. Colder climates, bulk storage at <50% purity to prevent freezing	1.55 mg/L $CaCO_3$ alkalinity per mg/L as NaOH	pH control is difficult when applied to poorly buffered water
Lime ($Ca(OH)_2$)	Raise pH. Increases alkalinity and calcium content	95-98% purity as $Ca(OH)_2$. 74% Active ingredient as CaO. Dry storage with slurry feed	1.21 mg/L $CaCO_3$ alkalinity per mg/L as $Ca(OH)_2$	pH control is difficult when applied to poorly buffered water. Slurry feed can cause excess turbidity. O&M intensive
Sodium Bicarbonate ($NaHCO_3$)	Increases alkalinity with little increase in pH	98% purity. Dry storage with solution feed	0.60 mg/L $CaCO_3$ alkalinity per mg/L as $NaHCO_3$	Good alkalinity adjustment choice, but very expensive
Soda Ash (Na_2CO_3)	Increases alkalinity with moderate increase in pH	95% purity. Dry storage with solution feed	0.90 mg/L $CaCO_3$ alkalinity per mg/L as Na_2HCO_3	More pH increase caused as compared to $NaHCO_3$, but less costly
Carbon Dioxide (CO_2)	Lowers pH. Converts excess hydroxyls to bicarbonate and carbonate species	Pressurized gas storage. Fed either through eduction or directly	None	Can be used to enhance NaOH or lime feed systems

Taken from: EPA (1992), Lead and Copper Rule Guidance Manual Volume II: Corrosion Control Treatment, Table 3-2, EPA 811-B-92-002

Phosphate Inhibitor

For systems recommending phosphate inhibitor for their treatment

The key to a successful corrosion control treatment program is maintaining a minimum orthophosphate residual throughout the distribution system. This minimum residual level varies with water sources, treatment method, water qualities, and the combined functional needs of the treatment. Ground water systems that are maintaining an ortho-phosphate residual at or above 1.0 milligram per liter (mg/L) (one part per million) are proven to be more successful in regaining their compliance with both the lead and copper action levels.

- Know your "combined" treatment needs for selecting the right product.

  At first glance, (zinc) ortho-phosphate will be the product of choice since it is the active ingredient for lead/copper control. In reality, it is limited to systems with a sound iron-removal treatment or systems that have no need for red-water and/or scaling control. Polyphosphate, on the other hand, is effective in red/brown water and scale control but, unless sufficient reversion to orthophosphate can occur in the distribution system, is not effective in lead/copper control. For systems with combined treatment needs, ortho-polyphosphate blend will be the right choice; the trick is to find the right ortho-polyphosphate ratio.

- Start treatment when routine flushing of the water main can be incorporated.

  Because of the "poly" element of a blended phosphate, sloughing is common during the first few months of the treatment with accompanying aesthetic water quality complaints from consumers. Periodic main flushing will help clean system dead ends, bringing up the phosphate level throughout the entire system, and, most importantly, eliminate the accumulation of nutrients in areas of low water usage and dead ends that may encourage microbiological growth.

- Monitor phosphate levels and increase the dosage gradually.

  Most water systems rely on vendors to start the treatment and establish the feed rate. The only way to ensure successful treatment is to set a target residual level and routinely monitor orthophosphate levels to make sensible adjustments, if needed. Weekly calibration and daily recording of phosphate dosage rates are necessary operating procedures.

Contacts in Wyoming

Construction permits, plan and specifications review

Wyoming statute 35-11-101 through 35-11-1207 requires public water systems to obtain a construction permit from the DEQ to construct, install or modify water treatment facilities. A plan and specification review must be done before the permit is issued.

Wyoming DEQ Water Quality Division-Larry Robinson	307-777-7075

Funding Assistance

Wyoming Drinking Water State Revolving Fund, contact:

Wyoming DEQ Water Quality Division-Brian Mark	307-777-6371

Grants

USDA Rural Utilities Service. Provides grants and loans to communities with less than 10,000 population 307-261-6319

Wyoming DEQ Abandoned Mine Lands Program. Provides grants to communities impacted by coal or mineral mining. (i.e. a community that can no longer rely on a mine operation for employment or tax revenue because of a mine closure.) 307-777-6145

HUD Community Development Block Grant Program (CDBG). Funds only available when you can demonstrate that at least 51% of the residents who will benefit from the drinking water treatment are low to moderate income. Moderate income for a Wyoming family of four is currently $34,250 per annum. To apply for CDBG grants you must work with your local or county government.

Steve Achter	307-777-2811
Terry Koerwitz	307-777-2812